

means of which the arcs are to be explicitly transmitted to the arc extinction chamber. The disadvantage of this arrangement is the fact that additional components must be provided

5 which are directly connected to the contact systems for a principal current. This complicates the structure of the low voltage power switch and low manufacturing and/or assembly tolerances already lead to a failure when the arcs are conducted away.

10 In addition, it is known in the case of a low voltage circuit breaker according to said type that provision must be made for an arc conductive element on the arc transmitting element which makes it possible to direct said arc in a defined manner to the arc extinction chamber (US 6,417,474 B1).

15 Publication US 4,885,441 describes an arc transmitting element with an arc conductive element in which the arc conductive element has two running edges running at different angles to a center line of the arc transmitting element in which case the running edges extend away from an edge zone in the direction

20 of a middle zone of the arc transmitting element.

It is the object of the invention to ensure the transmission of the arc to the middle zone of the arc extinction chamber.

According to the invention, this object of the invention is achieved by means of a low voltage circuit breaker with the

25 features mentioned in Claim 1. Because said arc transmitting element disposed between the contact system for a principal current and the arc extinction chamber comprises at least one arc conductive element which, in particular, has several running edges running at different angles to a center line of the

30 arc transmitting element extending in the direction of a top side of the arc extinction chamber which extend away from an edge zone in the direction of a middle zone of the arc transmitting element and as a result of the fact that the arc

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conductive element is formed crown-shaped and has several prongs formed ray-shaped to the center line, it is advantageously achieved, independent of the point of origin of the arc, that the arc is directed away from the contact systems for a principal current to be protected against burning down, and that a shorter arc extinction period is reached. This results in decreasing the stress on both the contact systems for a principal current, on the one hand, and the arc extinction chamber, on the other hand, because these basically can now, by means of a defined start-up by the arc, convert their arc extinction capacity with a high degree of effectiveness. It has been proven that by providing simple arc conductive elements to the arc transmitting element, it is possible to direct the arcs in a defined manner. Changes to the contact system for the principal current itself need not be made so that the modifications according to the invention are only limited to the arc transmitting element alone. As a result, the solution according to the invention is very simple and can therefore also be implemented cost-effectively in mass-produced low voltage circuit breakers.

In a preferred embodiment of the invention provision is made so that the running edges basically run parallel to the arc transmitting element. - As a result of this an optimum arc position can be controlled within the arc extinction chamber in a defined manner. - The running edges can be formed by a sharp-edged transition of a step in each case.

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In further preferred embodiments of the invention there is provision for the arc conductive element to be non-positively connected to the arc transmitting element. As a result the arc conductive element can be embodied in a simple fashion. This only requires the manufacturing of an arc conductive element with a simple design - for example, as a stamped part - and the fixing of this arc conductive element to the arc transmit

ting element - for example, by means of welding. In the case of a correspondingly selected system of ray-shaped prongs of the stamped part, the running edges can be determined for the 5 arc in a simple way. This particularly allows the different sizes of the arc extinction chambers can be adapted easily. The ray-shaped prongs preferably have two running edges for the arcs running at right angles to one another which run from the edge zone of the arc transmitting element into the middle 10 of the arc extinction chamber. As a result, depending on the point of origin and the intensity, it is possible to direct said adapted arc to the arc extinction chamber.

The arc conductive element connected non-positively to the arc transmitting element in addition offers the advantage that a 15 bigger cooling body is available in the zone of the arc transmitting element which favorably influences the extinction behavior of the arc extinction chamber.

At least one section of a wire, particularly a steel wire can also serve as an arc conductive element.

20 According to a further preferred embodiment of the invention provision can be made for at least one arc conductive element embodied as a profile part stamped from the plane of the arc transmitting element. This simplifies manufacturing of an arc transmitting element that features arc conductive elements.

25 At least one end plate of a stack of extinction sheets can be used advantageously as an arc transmitting element.

Further preferred embodiments of the invention can be found in the other features mentioned in the subclaims.

30 Other advantageous further developments of the invention are explained below on the basis of the accompanying drawings. They are as follows:

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## Patent claims

1. Low voltage circuit breaker with a contact system for a principal current (14) and an arc extinction chamber (10),
  - 5 - in which case an arc transmitting element (44) is disposed between the contact system for the principal current and the arc extinction chamber,
  - in which case the arc transmitting element (44) comprises at least one arc conductive element (46) in order to transmit the
  - 10 arc to the arc extinction chamber (10) in a defined manner which has several running edges (54) running at different angles to a center line (58) of the arc transmitting element (44) extending in the direction of a top side of the arc extinction chamber,
  - 15 - and in which case the running edges (54) extend away from an edge zone in the direction of a middle zone of the arc transmitting element (44), characterized in that the arc conductive element (46) is formed crown-shaped and has several prongs (56) formed ray-shaped to the center line (58).
2. Low voltage circuit breaker according to claim 1, characterized in that the running edges (54) basically run parallel to the arc transmitting element (44).
3. Low voltage circuit breaker according to one of the previous claims, characterized in that the running edges (54) are in each case formed by a sharp-edged transition (62) of a step (60).
4. Low voltage circuit breaker according to one of the previous claims, characterized in that the arc conductive element (46) is frictionally connected to the arc transmitting element (44).

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5. Low voltage circuit breaker according to claim 4, characterized in that the arc conductive element (46) is embodied as a stamped part.
- 5 6. Low voltage circuit breaker according to claim 4, characterized in that the arc conductive element (46) is formed from at least one section of a wire, particularly a steel wire.
7. Low voltage circuit breaker according to one of the previous claims, characterized in that at least one arc conductive element (46) is embodied as a profile part stamped from the plane of the arc transmitting element (44).
- 10 8. Low voltage circuit breaker according to one of the previous claims, characterized in that at least one extinction sheet (42) or end plate (43) of a stack of extinction sheets (41) serves as the arc transmitting element.
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